

ONE NATION, DIVISIBLE

Jeanne Wilson Johnson drives 4 miles from her 420-acre farm to a gas station in Caledonia, Mo., for better internet service.

RURAL AMERICA IS STRANDED IN THE DIAL-UP AGE

High costs and lack of access to broadband service prevent residents of far-flung communities from joining the modern economy

By Jennifer Levitz and Valerie Bauerlein | Photographs by Nick Schnelle for The Wall Street Journal

CALEDONIA, Mo.— Jeanne Wilson Johnson raises sheep and angora goats, and to sell the wool and mohair online she drives 4 miles to the parking lot of Roy's gas station, the closest spot for decent internet access.

At her 420-acre farm, Ms. Johnson pays \$170 a month for a satellite internet service too slow to upload photos, much less conduct business.

As in many rural communities, broadband here lags behind in both speed and available connections. Federal data shows only a fraction of Washington County's 25,000 residents, including Ms. Johnson, have internet service fast enough to stream videos or access the cloud, activities that residents 80 miles away in St. Louis take for granted.

"We don't feel like we're worth it," said Ms. Johnson, 60 years old.



Jeanne Johnson, right, trims wool from a sheep with help from Virginia Lachance at Ms. Johnson's property in Caledonia, Mo.

Delivering up-to-date broadband service to distant reaches of the U.S. would cost hundreds of billions of dollars, experts estimate, an expense government, industry and consumers haven't been willing to pay.

In many rural communities, where available broadband speed and capacity barely surpass old-fashioned dial-up connections, residents sacrifice not only their online pastimes but also chances at a better living. In a generation, the travails of small-town America have overtaken the ills of the city, and this technology disconnect is both a cause and a symptom.

Counties without modern internet connections can't attract new firms, and their isolation discourages the enterprises they have: ranchers who want to buy and sell cattle in online auctions or farmers who could use the internet to monitor crops. Reliance on broadband includes any business that uses high-speed data transmission, spanning banks to insurance firms to factories.

Rural counties with more households connected to broadband had higher incomes and lower unemployment than those with fewer, according to a 2015 study by university researchers in Oklahoma, Mississippi and Texas who compared rural counties before and after getting high-speed internet service.

"Having access to broadband is simply keeping up," said Sharon Stover, a University of Texas professor who studies rural communication. "Not having it means sinking."

Many rural schools have a fraction of internet speeds common at most American campuses. "Sometimes it feels like they get more education, and they get more prepared for their futures than we do," said David Bardol, a 13-year-old sporting a crew cut and Star Wars T-shirt. He attends Kingston Junior High in Cadet, Mo., one of the communities in Washington County.

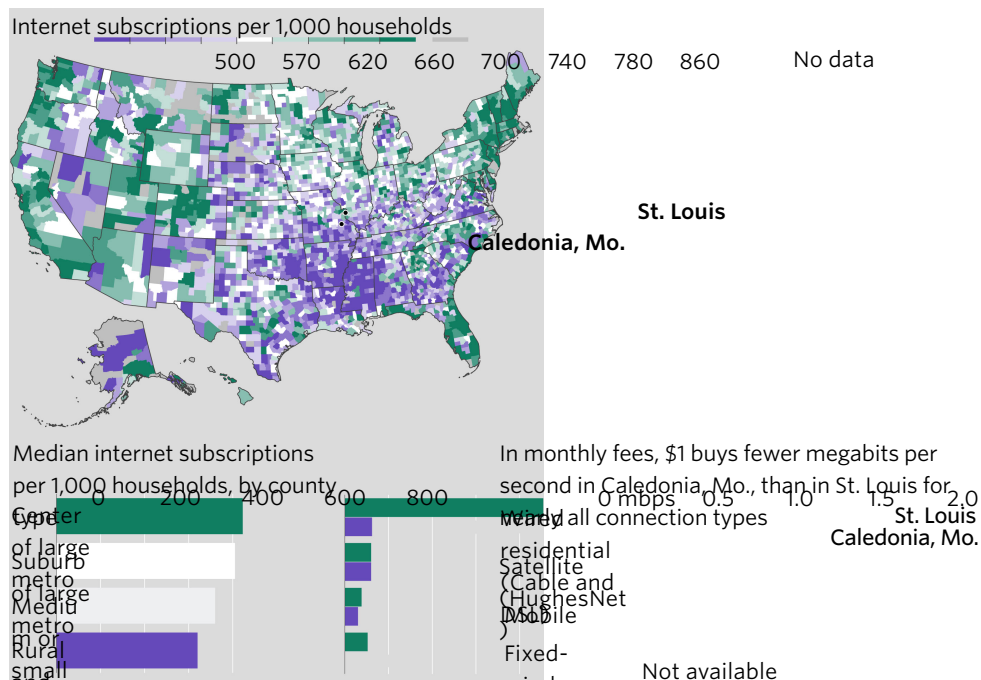
At the county's 911 center, dispatch director William Goad sometimes loses his connection to the state emergency system. That means dispatchers can't check license plates for police or relay arrest-warrant information.

As severe thunderstorms approached in late February, Mr. Goad tried to keep watch using an internet connection sputtering at speeds too slow to reliably map a tornado touchdown or track weather patterns.

"We drill for oil above the Arctic Circle in some of the worst conditions known to man," Mr. Goad said. "Surely we can drop broadband across the rural areas in the Midwest."

Rural America Stuck in Time Lag

Sparsely populated parts of the U.S. have less access to broadband internet service, leaving rural communities with wireless alternatives that are slow and expensive.



*Average of four major providers. Monthly download caps vary for each. Notes: Subscriptions are defined as fixed internet connections of over 200 kbps in at least one direction; figures as of June 30, 2016.

Graphics by Andrew Van Dam and Kathryn Tam Sources: Federal Communications Commission (subscription ratio); BroadbandNow (advertised connection speeds and costs)

About 39% of the U.S. rural population, or 23 million people, lack access to broadband internet service — defined as “fast” by the Federal Communications Commission — compared with 4% of the urban residents.

Fast service, according to the FCC, means a minimum download speed of 25 megabits per second, a measure of bandwidth known as Mbps. That speed can support email, web surfing, video streaming and graphics for more than one device at once. It is faster than old dial-up connections—typically, less than 1 Mbps—but slower than the 100 Mbps service common in cities.



The intersection of Missouri state highways 8 and 21 in Potosi, Mo.

In St. Louis, speeds as fast as 100 Mbps start at about \$45 a month, according to BroadbandNow, a data research company. Statewide, an estimated 61% of rural residents lack broadband access.

Expanding rural broadband is a priority of FCC Chairman Ajit Pai, who grew up in Parsons, Kan., population 9,900. “If you don’t have a digital connection, you are less likely to be able to succeed,” he said.

At a weekly gathering of wool producers at a 1930s-era Craftsman-style bungalow, Ms. Johnson and others snacked on local goat cheese and deer sausage. They talked about internet sites for buying and selling raw mohair, mohair locks and mohair yarn—of which they have a bounty.

But with limited internet service, Virginia LaChance, who keeps sheep and spins wool, said, “We’re not in competition with them. That’s the problem.”

Costly connections

Rural America can’t seem to afford broadband: Too few customers are spread over too great a distance. The gold standard is fiber-optic service, but rural internet providers say they can’t invest in door-to-door connections with such a limited number of subscribers.

St. Louis has more than 5,000 people per square mile compared with 33 in Washington County, according to U.S. Census figures.

ONE NATION, DIVISIBLE



- Rural America Is the New ‘Inner City’
- Struggling Americans Once Sought Greener Pastures—Now They’re Stuck
- Rural America’s Childbirth Crisis: The Fight to Save Whitney Brown

Fiber-optic trunk lines already make up much of the U.S. internet backbone. The trouble is reaching individual rural customers. It costs roughly \$30,000 a mile to install optical fiber cable, according to industry estimates, to trench and secure right-of-way access.

Most rural communities rely on existing telephone technology that transmits data over copper lines. Even with upgrades, those lines can’t deliver data at speeds common to fiber-optic networks.

Smartphone service is available but has coverage gaps and isn’t always reliable in rural communities such as Washington

County. Even when it works, cell service can’t match the speed or capacity of broadband. “You just can’t compete,” said Brian Whitacre, an agricultural economics professor at Oklahoma State University. “Running a business with a smartphone is not going to happen.”

Alternative internet technologies—satellite dish or fixed wireless, which uses cellular networks to beam data short distances using antennas and transmitters—struggle to handle video streaming or other high-data uses. Those services also typically cap the amount of data used each month.

The 25-bed Washington County Memorial Hospital, which has service of 10 Mbps, loses internet connections often enough that ambulance drivers are told to divert critical patients, whose CT scans are transmitted to specialists, to a hospital 40 minutes away, said Michele Meyer, the county’s interim chief executive.

The city clerk in Irondale, who is connected to the internet through existing copper lines, can’t attach financial reports to email because it is so slow.

The Red Wing Shoe Company’s factory in Potosi, which invested in a fiber-optic line, lost internet service for 30 hours last summer and again in May, outages that delayed shipment of more than 10,000 pairs. The company couldn’t access inventory or print stickers for shoeboxes, said John Gardner, the plant manager:

"It brought us to our knees." Red Wing's other U.S. factories have backup internet providers, a company spokesman said.



Boots on the production line at the Red Wing Shoe factory in Potosi, Mo.

Such dependence illustrates how broadband has become a basic service alongside telephones and electricity, said Bonnie Prigge, executive director of the Meramec Regional Planning Commission, which aids economic development in eight rural Missouri counties including Washington. Installation of those utilities in the 20th century, she said, took investment and special effort.

In 1935, when just 10% of rural America had electricity, President Franklin D. Roosevelt pledged to get service to almost every far-flung farm. Two decades later, electrification had reached more than 90% of rural areas, said Richard Hirsh, a history professor at Virginia Tech.

By the end of 1954, a federal program had lent \$2.9 billion, typically to farmers who formed cooperatives to build and operate electricity systems, said Christopher McLean, of the Agriculture Department: "It's one of the most amazing American success stories ever."

Some lawmakers are pressing the Trump administration to include rural broadband in an anticipated \$1 trillion infrastructure package. The White House hasn't said how any such projects might be funded.

"Rural broadband, we need that quite honestly more than we need roads and bridges in many of the counties I represent," U.S. Rep. Austin Scott (R., Ga.) said at a May 17 House committee hearing on the rural economy.

Secretary of Agriculture Sonny Perdue said broadband connectivity should be seen as the "roads, sewers and water" of the modern age. "The good news is, this is square on the radar scope of the president," he said at the hearing.

Mr. Pai, President Donald Trump's FCC chairman, said rural broadband should be included in the expected infrastructure package. He would like to boost subsidies, rewrite regulations to cut red tape and accelerate the FCC's own processes, he said, which have slowed access to rural broadband.

The Obama administration earmarked \$7 billion from the 2009 stimulus package for expanding rural broadband service. Half the money went to a program that the administration estimated would reach 840,000 households and businesses, according to a 2014 review by the Government Accountability Office. There still isn't a tally of how many were connected and at what speeds, government officials said.

Missouri broadband providers received \$261 million of the stimulus money. “The intent was to spread accessibility throughout the state,” said Luke Holtschneider, the state’s Rural Development Manager. “But that program did not on its own continue to expand in the community like you would hope.”

Big River Communications, a St. Louis telecommunications provider, collected about \$20 million in stimulus money—half in grants, half in loans—to connect parts of southeast Missouri, including Washington County.

The company set up a tent at the Dickey Bub farming supply store in Potosi, the Washington County seat, and gave away hot dogs to potential subscribers. Plans started at \$14.99 a month for students, seniors and low-income households. But the project didn’t quite pan out, said Krista Snyder, executive director of the Washington County Industrial Development Authority.

Big River built a wireless network to transfer data between company towers and devices installed at homes and businesses. The technology is much slower than fiber-optic systems but better than dial-up service, said Big River President Kevin Cantwell.

The \$14.99 promotion rose to monthly prices that range from \$49.99 on a limited data plan to \$99.99 for unlimited use. The prices are for “high-speed” connections—typically at speeds from 2 Mbps and 7 Mbps, the company said.

Big River estimated it would reach 52,000 homes and businesses with its share of the stimulus money. Nearly five years after its first tower began operation it has 4,000 subscribers in seven counties but is trying for more.



Jeanne Johnson pets a sheep at her farm in Caledonia, Mo.

“I just want to know what happened to all the money and grant and things,” said Ms. Johnson, the sheep farmer. “We didn’t see any benefits.”

Mr. Cantwell said parts of Washington County are too thinly populated—and, therefore, too expensive—to reach. “It wasn’t a slight to anybody, but we have to pay the government back and be able to provide for our employees,” he said. “We’ve got to make some money.”

Ronnie Trent, a 44-year-old electrician in Washington County, said more people would sign

up if the service was better. “There are enough people out here who are hardworking people who pay their bills and who would pay for that,” he said, but the speeds are “pretty much terrible.” He subscribes, but his wife, a schoolteacher, finds it is too slow to work at home in the evenings.

Self-serve systems

Some rural communities have successfully done the job themselves.

In central Missouri, Co-Mo Electric Cooperative, Inc., a not-for-profit, customer-owned co-op formed in 1939 to deliver electricity, started a fiber-optic network that has built connections to 25,000 members in a region more sparsely populated than Washington County. So far, it has 15,000 subscribers, including non-members in neighboring communities..

Co-Mo’s members, which include farms and businesses, realized they were falling behind, said John Schuster, board chairman of Co-Mo Connect, the

internet service. Residents had to drive to the parking lot of a community college to work online. Students at local schools were cut off from the internet.

A fiber enclosure on a power pole belonging to the Co-Mo Electric Cooperative, Inc. in Smithton, Mo. The fiber-optic broadband network that so far has more than 15,000 subscribers. Travis Bockoven, a contractor in Windsor Place, Mo. Rolls of fiber cable at the co-op's headquarters in Tipton, Mo. PHOTOS: NICK SCHNELLEN



The cooperative, after failing to obtain government subsidies, borrowed \$80 million from two private institutions that serve utilities and went door to door asking members to contribute \$100 each. In 1939, the co-op asked each member to contribute \$5 toward electrification.

Rather than only digging trenches for fiber-optic cable, Co-Mo strung cable along its own utility poles and rented space on others. An estimated 70% of Co-Mo internet subscribers have 100 Mbps service that costs \$49.95 a month, Mr. Schuster said.

The co-op's internet service is doing well financially, Mr. Schuster said, but "the definition of making money for me and for a shareholder from AT&T is going to be two different things."

Such local broadband systems are tough to duplicate. Nearly all government subsidies go to major telecommunication providers, a legacy of the FCC's long relationship with phone companies, said Jonathan Chambers, a former FCC strategic planning chief, now a consultant to cooperatives.

Mr. Pai, the agency chairman, said the next phase of FCC subsidies would be open to all types of providers.

While some rural communities have built their own systems, laws in at least 19 states restrict such efforts, generally on the grounds they pose a threat to private companies. A GOP-sponsored bill that set up obstacles to similar broadband efforts stalled this spring in the Missouri legislature.

Every other Thursday, Dr. Stuart Higano, a cardiologist from Missouri Baptist Medical Center in St. Louis, visits the family practice office of Gregory Terpstra in Potosi, Mo., to see patients.



Darrell Dostal, left, talks about his leg pain with Dr. Gregory Terpstra in Potosi, Mo.

The office has internet service at 10 Mbps from CenturyLink Inc., too slow for Dr. Higano to efficiently connect with the database at his hospital to access patient records or view heart images. "Everything in medicine now is electronic medical records," he said.

Dr. Terpstra, age 69, now has a copper line that connects his office to the fiber-optic cable that runs through town. To get a faster and more reliable connection, CenturyLink said it would have to install 1,000 feet of fiber-optic line to his office

and charge the higher monthly fee.

Earlier this year, Dr. Terpstra, dressed in a bow tie and white coat, said he got a quote for fiber-optic service that ranged from \$563 a month for 20 Mbps to \$1,190 a month for 200 Mbps.

“Does that sound like a good deal?” he said.

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By Jennifer Levitz and Valerie Bauerlein | Photographs by Nick Schnelle for The Wall Street Journal

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POLITICS & POWER

THE BATTLE FOR THE INTERNET IN RURAL AMERICA



WHY YOU SHOULD CARE

Because accessing the web is fast becoming as essential as flicking on a light.

PART OF A SPECIAL SERIES FROM OZY

STATES OF THE NATION



By Nick Fouriezos

THE DAILY DOSE MAR 02 2017

So much of Blacksburg is made up of Virginia Tech. But drive 15 minutes in any direction and this **emerging tech hub** of a town gives way to rural, rolling plains of farmland. That geographic divide also marks a digital wall between internet haves and have-nots — one fiercely felt along the 40-mile stretch between Blacksburg and Roanoke, a city of 100,000-plus people whose broadband speeds are slower than those found in the capital of Latvia.

A similar digitally divided drama is playing out across America, as access to high-speed internet becomes the great infrastructure opportunity of this century — and a challenge, perhaps, even more pressing than the “crumbling” highways, bridges and airports that President Donald Trump has promised to address. Broadband is “taking its place alongside water, sewer and electricity as essential infrastructure,” the Broadband Opportunity Council declared under President Barack Obama. And it manifests itself along the fault lines of the American experience: Former state auditor **Adam Edelen**, founder of the left-leaning New Kentucky Project, called it “a precondition, something you have to have.” That was after he toured the state and watched how McDonald’s in rural parking lots would fill up around school-pickup time as parents and their children scrambled to check the internet and download homework assignments before heading home to slow, or nonexistent, connection speeds.

NOWHERE IN AMERICA, IT SEEMS, HAS THAT KIND OF TUG-OF-WAR BEEN WAGED MORE PUBLICLY THAN ALONG THIS BLACKSBURG-ROANOKE CORRIDOR IN SOUTHWEST VIRGINIA.

In Blacksburg, a satellite **Silicon Valley** is emerging, with startups Card Isle, a Redbox for greeting cards, and Moveline, a moving-company-price-comparing service, among dozens of others all calling it home. Overlooking the grassy stains and sloping foothills just minutes from the Hokies football stadium, the cloud-storage behemoth Rackspace has created a campus replete with rock-climbing walls and, yes, Ping-Pong tables, just a few miles away from less hospitable cyber climes.

Over in Roanoke, a fragile compromise struck between business and government has laid track for industry-leading fiber internet. The effort is seeking to salve a city where a local councilman recently had trouble selling his home because speeds weren't fast enough for work-from-home buyers, he told OZY, and where a neighboring county with poor North Shore parents have to drive their children back to school after hours to finish their homework, according to local officials. Following concerns from local businesses that led to action, Roanoke has seen the first fruits of its internet investment: Local software firm Meridium, which benefits from the new fiber, was acquired for \$500 million by **General Electric**.

But even amid progress, these gains have triggered an impassioned debate about the relationship between government and industry that's traditionally remained private. "Stand strong and resist the tempting voices. Those are luring voices of the sirens of government that promise increased economic development and prosperity if only we will allow them to take our money and grow just a little larger," Al Bedrosian, Roanoke County supervisor, warned residents at a press conference outside the county administration building. And looming over the region's attempts to expand internet access is one major obstacle: the Commonwealth of Virginia, which this spring considered a broadband bill that rural residents fear will kill local efforts to reach the under-connected.





Rackspace has established its own outpost in Blacksburg.

SOURCE OZY/NICK FOURIEZOS

Across the country, more startups are emerging in places like Blacksburg — mid-market cousins such as Portland and Chattanooga as well as big-brother behemoths like Austin and Boston. Most boast a longer retention rate and exist in places with a fraction of the living costs. “Silicon Valley is bursting at the seams,” says Jacob Demmitt, a former colleague and technology reporter who has covered startup culture in Seattle and, now, at *The Roanoke Times*. “All these hubs are developing.” Ron Rordam, Blacksburg’s mayor of more than a decade, says its success wouldn’t be possible without the ethernet network it launched back in the early ’90s — a choice that landed it plaudits in *The New York Times* and a spot as the “Most Wired Community” in 1998’s *Guinness Book of World Records*. “It put us on the map,” Rordam says.

But by around 2010 only 8 percent of the region could access the gold standard of connectivity — fiber — compared to 24 percent nationally. And just 4.5 percent could access gigabyte-per-second speeds, the type that Chattanooga could access, according to a report commissioned by local municipalities. Starting in 2012, the city, county and nearby Salem began laying groundwork for a government-provided regional broadband skeleton. Now 50 miles are covered, with another 25 miles in the works, for a cool \$7.5 million. While Roanoke features the population today, Blacksburg, whose 40,000 residents are dominated by university students and faculty, has the know-how and talent to help the region compete for successful partnerships. “We can make more things happen,” says Rordam. “If they’re going to leave for a more urban environment, I want them in Roanoke.”

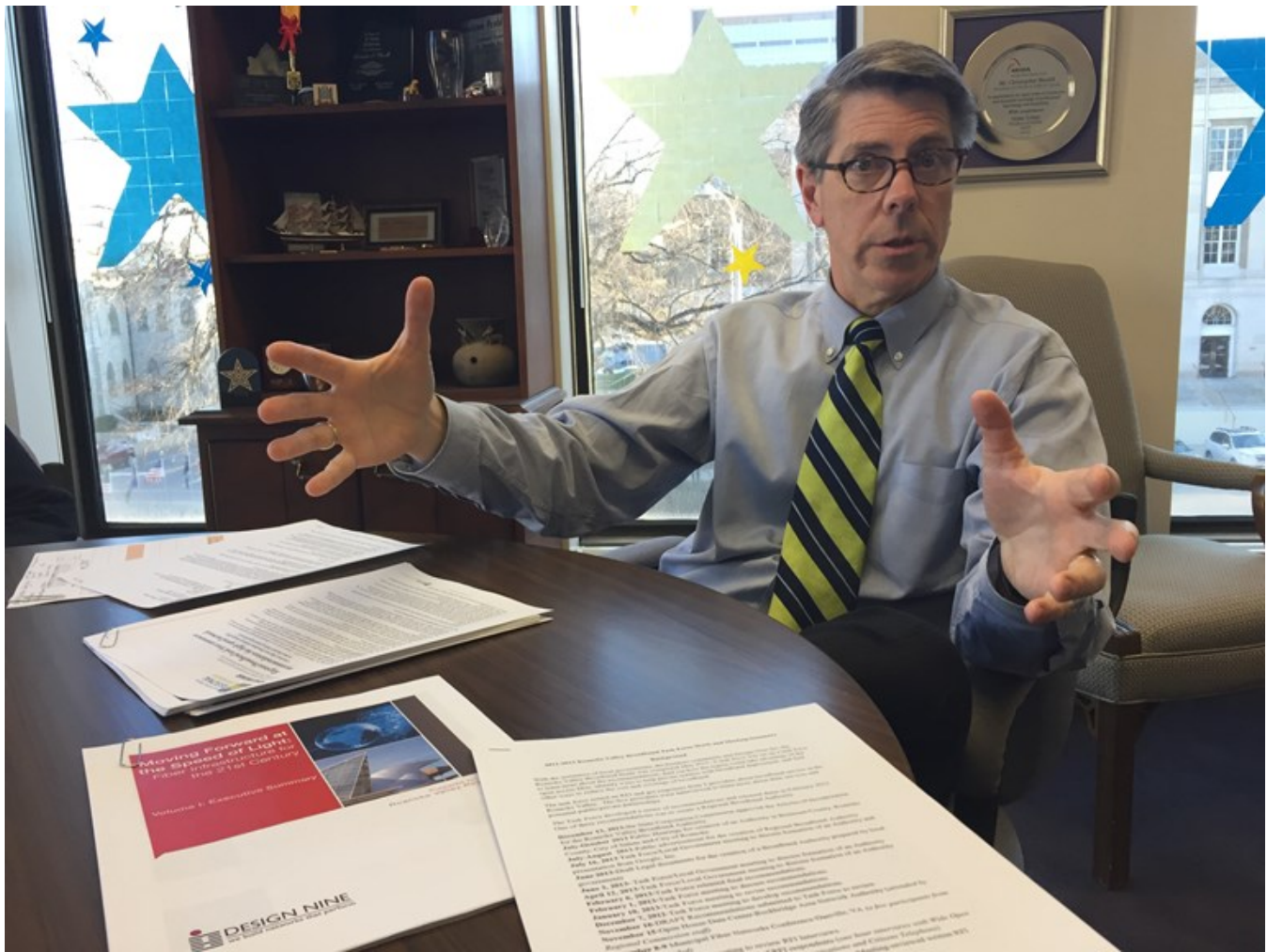


As the nation debates about the need for infrastructure upgrades, activists in rural areas wonder if internet should be part of the package.

SOURCE OZY/NICK FOURIEZOS

The initial effort to provide better internet is costly, which is why profit-focused national providers are loathe to invest, particularly in less-sexy locales. That's why smaller municipalities feel compelled to pursue public solutions in a field typically led by private companies, as Roanoke did with the formation of its Roanoke Valley Broadband Authority, the engine driving its internet efforts. However, the process is hardly without controversy, a reality Roanoke city manager Christopher Morrill readily admits but argues is beside the point. "We can sit here and philosophically say we don't want to be in the business while we watch the jobs go to Durham and Asheville — but I don't think that's acceptable."

That ideological battle raged nationally in October, when a federal appeals court shot down an attempt by the Federal Communications Committee to keep states from banning city-run internet programs, with such limiting laws having been passed in North Carolina and Tennessee. The decision was a win for commercial internet service providers such as Comcast and Verizon, protecting them from government competition in those states, experts say. And in Virginia, it paved the way for a fight that erupted this spring, when Republican state delegate Kathy Byron proposed a bill that would require publicly run providers to disclose more of their dealings and first give private companies the chance to offer service — even of a lesser quality and higher price — before governments step in. The goal was to "expand the availability of broadband to Virginians who do not currently have it," Byron said at a press conference while defending taxpayer money. "Making huge capital investments with already stressed budgets in rural areas, with risky returns on the investment, really needs to have oversight."



Roanoke City Manager Christopher Morrill outlines the efforts to expand broadband access in the region through a city-led partnership, which has drawn controversy.

SOURCE **OZY/NICK FOURIEZOS**

Critics point to the fact that Byron has received tens of thousands in contributions from telecom companies, including \$36,000 from Verizon and \$9,250 from AT&T, calling it the so-called Municipal Broadband Death Bill. Byron, who didn't respond to a request for comment, has acknowledged that she reached out to internet service providers for language regarding the bill but has denied allegations that those industry officials had a part in crafting the legislation. Meanwhile, State Senator Jenn McClellan, who works for Verizon as a general counsel, fears companies will leave rural Virginians without high-speed internet because of the cost. "If they were going to, it would have been done by now," says the Richmond Democrat, who has recused herself from the vote because she believes it represents a conflict of interest.

The existential wrestling match is a reminder of the difficulty of effecting meaningful change when public need faces private interests. That's especially true in Virginia, and 39 other states that operate under the Dillon Rule, where cities, towns and counties are prohibited from passing laws not explicitly approved by the statehouse. Practically, it means less local control — and after two rewrites and intense public scrutiny, the Byron bill passed the house in February. Now, an even more pared-down bill awaits state senate approval.

As the state and nation remain roiled in debate, local officials continue cautiously. For Roanoke, which was built on railroads whose tracks went quiet and, with them, local manufacturing, the city has only recently recovered as it transitions from "a rail town to a brain town," as Demmitt puts it. And the possibility of better internet holds promise for beleaguered economies in places such as nearby Martinsville and Danville, where severe population declines came after the two principal industries — tobacco and manufacturing — collapsed during the '90s, after the passage of NAFTA. "How do you take those companies and people," says Blacksburg's Rordam, "and give them the opportunity to stay in their homes, in their communities, and work remotely?"

STAY INTERESTING.

[THE BIG PROMISE](#)

How do you do business without high-speed internet?

By [Caitlin Esch](#)

June 20, 2017 | 3:00 PM

President Trump pledged sweeping political and economic changes during the campaign. We have no idea if Trump can deliver on those promises, but we can explore what it's going to take for him to try. It's all in our series [The Big Promise](#).

Driving around rural [Erie County](#), Pennsylvania, what you notice — aside from rolling hills, old farm houses, and the occasional small town — are the movie rental stores.

There are a lot of them.

Jamie Buie is the manager of Family Video in Erie City. As she rang up a customer with a towering stack of DVDs, she said her decision to take a job here five years ago came down to internet access.

"For the longest time, we had satellite internet," Buie said. "And with satellite internet, you have no way to stream movies at all. So that was why I originally picked my job with Family Video, so I could get cheap rentals."

Thirty-eight percent of people in rural Erie County don't have access to fixed broadband, according to the FCC's [2016 Broadband Progress Report](#). Nationwide, almost 40 percent of rural Americans lack access to fixed broadband, compared to just 4 percent of urban Americans.

The movie rental business might benefit from lack of broadband, but it's hurting many others. Paul Czarnecki is the master taxidermist at Tri-State Taxidermy. As he mounted a brown trout, he explained the look he was going for as, "Lifelike. Realism to the nth degree."

Czarnecki relies on the internet to search for images, and to connect with customers around the world. He lives above his business and until recently, he and his family got by on just 40 gigabytes of data through their smart phone plan. That meant each Google search came with a cost-benefit analysis.

“You didn’t dare get close to 40 because the overage charges are ridiculous,” said Christie Mahany, Czarnecki’s wife.

Mahany sells real estate in Erie County. She said it can be tough to sell families on homes without access to broadband.

“Everything is available. You wanna eat Chinese? Thai? Great. It’s definitely got a small town feel with all of these amenities,” said Mahany. “But oh, you wanna live there? Just so you know, you can’t get internet. And can’t get internet is almost like saying you have to take a bucket out to the well and pump your own water.”

Erie County has fought to get big companies, like Verizon and Spectrum, to bring the county up to speed. But companies want to go where it’s profitable.

"Spectrum has a business model that we use to determine the feasibility of any build. The fewer homes per mile, the more difficult it becomes to justify building out," said William Morand, a spokesman for Spectrum, in an email. "Because 100 percent of our capital is private (we receive no government funding), our construction decisions and justifications are based on our business model."

Lisa Vallimont, secretary and elected supervisor for Greene Township, a municipality in Erie County, said: “We, a lot of times, don't meet the 20 homes-per-mile criteria that a lot of these internet companies want. They came out and did a field study and found it wasn’t cost effective. The residents would be required to pay the installation of an estimated \$20,000.”

Pennsylvania does have a law, [Act 183](#), that required broadband access for everyone by 2015. The problem was, it only applied to telephone companies, not cable companies like Spectrum. And it was written in 2004 when “high-speed” meant a download speed of 1.544 Mbps, exponentially slower than the FCC’s standard for 2017 of 25 Mbps.

Erie County [overwhelmingly voted](#) for Trump. Now residents are hoping the Trump Administration prioritizes internet infrastructure along with bridges and roads.

https://motherboard.vice.com/en_us/article/qv4a5w/heres-a-glimpse-at-what-living-with-modern-rural-internet-is-really-like

SLOW LANE

What Living With Modern Rural Internet is Really Like

LEIF JOHNSON

Jun 20 2017, 5:00am

The FCC chairman wants to make it easier to bring broadband to rural areas, and it's a noble goal.

Trump-appointed Federal Communications Commission Chairman Ajit Pai rightfully gets a lot of crap for his hostility toward net neutrality, but as someone who lives and works out where the Milky Way still shines in its full glory at night, I can't help but admire his talk of bridging the "digital divide" between "those who can use cutting-edge communications services and those who do not." This is a necessary thing. I don't think people in major cities understand how bad it is out here.

In a statement last week, Pai praised Rep. Doug Collins (R-GA) for introducing a bill that would provide tax incentives for companies who expand broadband internet access to rural areas in what Pai calls "Gigabit Opportunity Zones." Pai described these zones in a speech outlining his agenda last September.

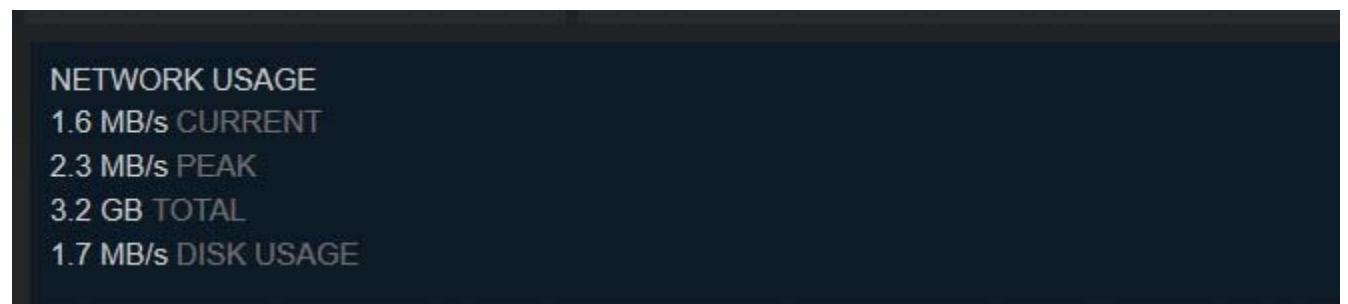
"The concept is simple," he said. "Provide financial incentives for internet service providers to deploy gigabit broadband services in low-income neighborhoods. Incentivize local governments to make it easy for ISPs to deploy these networks. And offer tax incentives for startups of all kinds in order to take advantage of these networks and create jobs in these areas."

Last month Sen. Shelley Moore Capito (R-WV) introduced a similar bill to that of Collins's in the Senate.

"Having just traveled across five Midwestern and Northern Plains states, I can tell you that much of rural America is on the wrong side of the digital divide," Pai, a native of rural Parsons, Kansas, said in his statement. "Many urban areas are, too. Encouraging investment in economically disadvantaged communities can close that divide and benefit all Americans."

So how bad is it on the other side of the digital divide? Let's put it this way. I live on a ranch in rural Goliad County, Texas, which only has 7,500 people. Yes, in the entire county. I'm currently writing this while using my iPhone's Verizon hotspot, as the internet service I pay \$116 a month for constantly keeps cutting out. I suspect it's because the anaqua tree in the old corral has grown enough to block the fixed signal as it comes in from the cellular tower in town, and I currently don't have time to trim it or chop it down. It doesn't bother me; I have an unlimited plan and the hotspot's slightly faster anyway. This, after my provider recently triumphantly told me he'd upgraded my service to 12MB per second. I was getting 5 before. In practice, most of the time I'm lucky to get 2MB per second.

So yeah, hi, I'm a tech journalist who's chiefly known for his work with gigabyte-heavy video games, and somehow I live with this as my reality.



From my Steam account. This is on a good day. Image: Leif Johnson/Motherboard

In such circumstances, ads for services like Verizon FIOS—which offers 150 MBps for \$80 a month—seemed steeped in myth. Almost every aspect of contemporary internet interaction requires tolerating some kind of compromise. We're quite capable of enjoying Netflix and Hulu out here, but I find myself reluctant to use the latter since every commercial break resets the download stream and triggers multiple starts and stops before the picture starts moving again. Many people I know still buy physical games and movies, not out of a belief in their inherent superiority, but because they simply don't require hours or days for the media to download. The internet can be such a hassle that many people don't even bother with it. Tacking a paper ad on the corkboard at the local feed or grocery store, for instance, is a far better way to get attention than posting an ad on Craigslist.

Mind you, I have it good. You can find a dead zone a few miles northwest of me where you can't get any fixed wireless service at all. You'll have to deal with satellite internet there, which is usually saddled with outrageously low data caps. The fact that I can even do my job out here proves that the dream of the internet as a tool that connects us all is partly a reality. Just a little more than a decade ago, I would have had to live in San Francisco or New York to do what I do. Yet my situation also proves how important it is for internet access to keep up with the times to maintain that ideal. As it is, I see my professional situation growing more precarious here by the day. Streaming live gameplay footage is essentially out of the question here due to sluggish upload speeds, which means I'm missing out on substantial publicity. Downloading 45GB games can take many hours, which can impact my deadlines for quick turnarounds.

This list, frankly, is just a taste of what we have to deal with, and I know I'm a special case both owing to my circumstances and the fact that I'm one of the few people willing to pay such an insane price for what counts as decent internet service here. It's only getting worse as regular file sizes get larger and larger with each year and as we embrace the so-called "4K revolution."

Hopefully this can be accomplished without sacrificing net neutrality in the process, but as things stand, rural America is getting left behind.

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<https://fivethirtyeight.com/features/the-worst-internet-in-america/amp/>

JUL. 27, 2017 AT 9:00 AM

The Worst Internet In America

By [Clare Malone](#)

Filed under [Internet](#)

Photographs by [Morgan Levy](#) Graphics by [Ella Koeze](#)

To drive the length and breadth of Saguache County, Colorado, is a dangerous undertaking. The roads, at least in spring, are lonely, clear and straight — “drive 30 miles then take a left” is the gist of most map directions. But the views are what can drive a person to distraction, veering recklessly over dotted yellow lines. There are hayfields drowned in water, blue and glassy so it looks like the sky fell into them, football fields full of black cattle standing stock-still like museum statuary, signs along empty stretches advertising meet and greets with the “Happy Gilmore” alligator, and crop planes that totter and swoop perilously over power lines before misting fields so green you think they might have invented the color.

The beauty of Saguache County can be an inconvenient one, though, particularly in the 21st century: It has some of the worst internet in the country. That’s in part because of the mountains and the isolation they bring. Saguache (sah-WATCH’) is nestled in between the Sangre de Cristo and San Juan ranges, a four-hour drive southwest of Denver. Its population of 6,300 is spread across 3,169 square miles 7,800 feet above sea level, but on land that is mostly flat, so you can almost see the full scope of two mountain ranges as you drive the county’s highways: the San Juans, melted into soft brown peaks to the west, and the Sangre de Cristos, sharp, black and snowcapped, thrusting almost violently upward to the east.

FiveThirtyEight analyzed every county’s broadband usage using data from researchers at the University of Iowa and Arizona State University 1 and found that Saguache was at the bottom. Only 5.6 percent of adults were estimated to have broadband.

But Saguache isn’t alone in lacking broadband. According to the Federal Communications Commission, 39 percent of rural Americans — 23 million

people — don't have access. In [Pew](#) surveys, those who live in rural areas were about twice as likely not to use the internet as urban or suburban Americans.

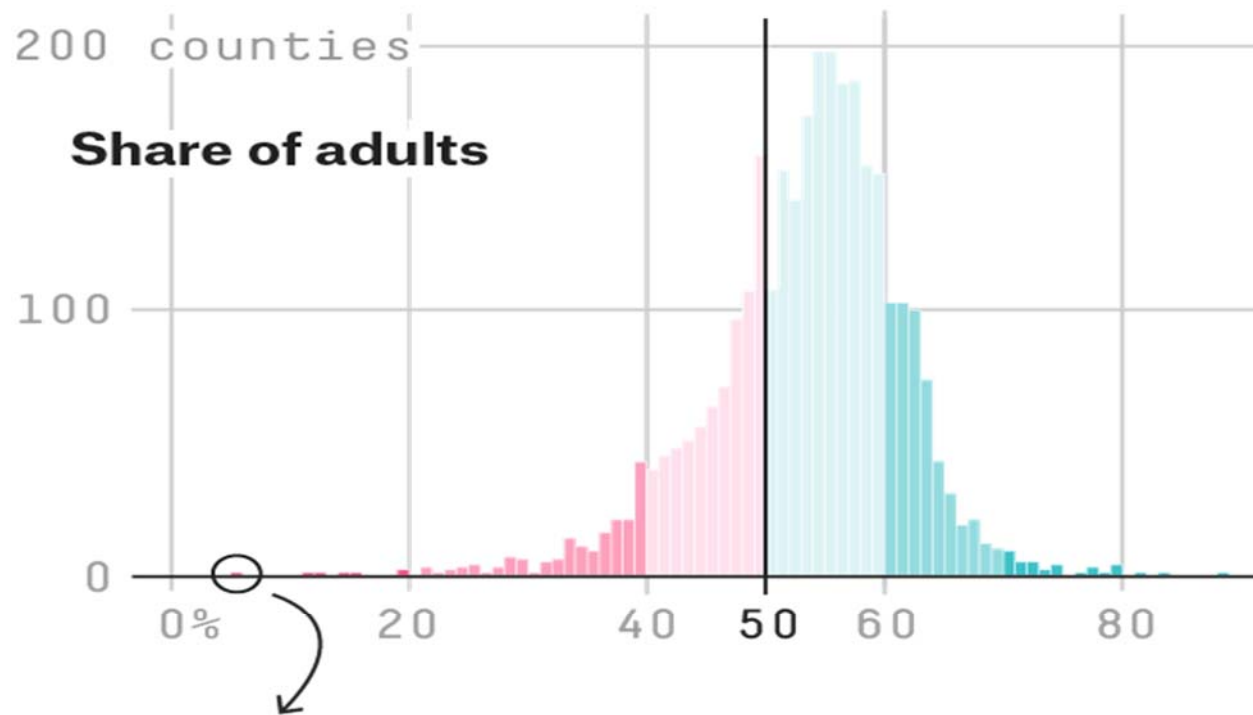
The FCC now defines broadband internet as the ability to download information at 25 megabits per second and to upload it at 3 megabits per second. This sort of connection enables a person to do the things that most Americans with home internet like to do — watch Netflix, play video games, and browse online without interruption even if a couple of devices are on the same connection. For around \$30 a month, New York City internet providers offer basic packages of 100 Mbps service. In Saguache County, such a connection is rare; if a household wants a download speed of 12 Mbps with an upload speed of 2 Mbps, they can expect to pay a whopping \$90.

This would be less of an issue if the internet weren't so central to modern life. But taxes, job applications, payroll operations, banking, newspapers, shopping, college courses and video chats all are ubiquitous online. Saguache County's students are expected to take their state assessments online even though an administrator at one school that houses K-12 students told me that until last year, the internet often went down for a couple of hours or even all day in the building.

The tide long ago turned from paper to digital in American life, and yet the disparities in access to the internet in parts of the country can be stark. Rural communities often face logistics problems installing fiber-optic cable in sparsely populated areas. In Saguache, internet problems are both logistical and financial; the county is three times the size of Rhode Island, while 30 percent of residents live below the poverty line.

Some would argue that the social contract has changed and that fast internet isn't just a luxury — it's a right of all 21st-century Americans. If that's the case, we're far from ensuring it. Just spend a few days hopping from town to town on Saguache's long stretches of road.

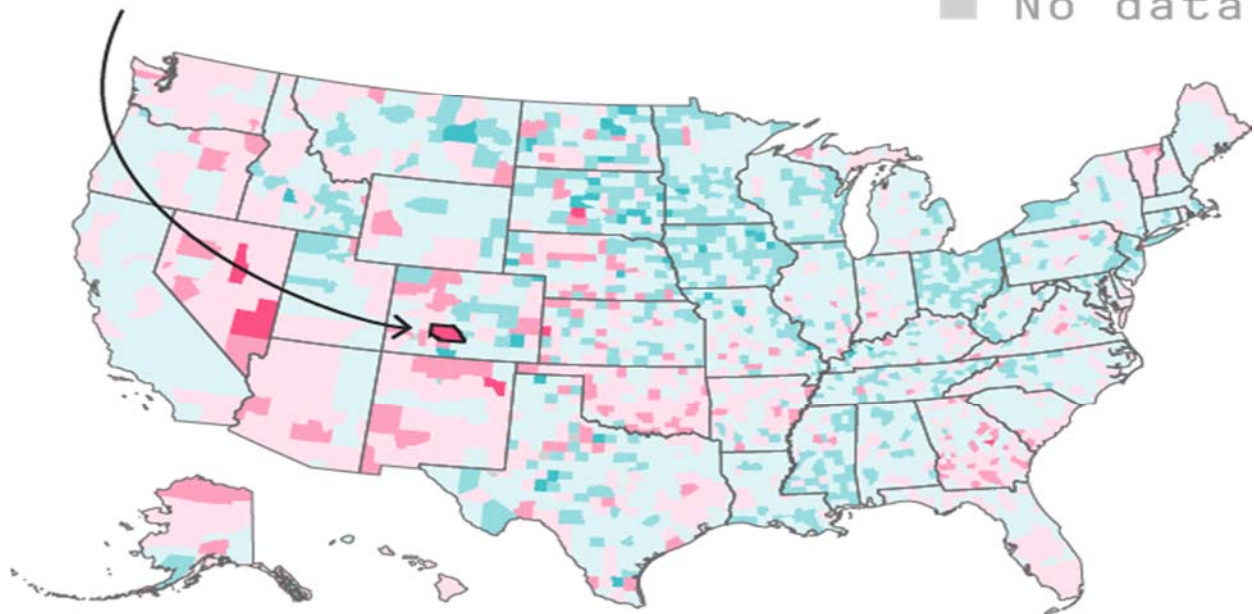
Many people don't have good internet Estimated share of adults with typical internet speeds faster than dialup, by county



Saguache County, CO

5.6%

■ No data



County shares are estimated using data from a 1 percent sample of 240 million voting-age Americans provided by Catalist, an election data firm. Internet connections faster than dial-up include those via DSL, cable, fiber-optic, satellite, etc.

The U.S. has a long history of trying to bring utility access to all Americans. In the early 1930s, when President Franklin D. Roosevelt established the Rural Electrification Administration, 90 percent of American farmers lived without power. Many families could not access running water, heat and light for the home. The cost of running electric lines to the country's most remote areas was prohibitive for profit-seeking businesses, but the REA found eager partners in rural electric cooperatives that had started to spring up in small communities with an eye toward modernization. The government began providing the co-ops loans to build out their electric networks, and by the end of the 1940s most farms in the country had power.

With clear eyes brought by 80 years of hindsight, it's obvious that Americans should have access to electricity — the country's economic and social well-being depends on it. Advocates of universal broadband argue the same could be said of fast internet. Already, the law says that all Americans should have access to internet services, thanks to the 1996 Telecommunications Act, which expanded the notion of universal service beyond just the right to telephone service. In 2017, many co-ops see bringing high-speed internet to the most isolated places in the United States as the 21st century's answer to rural electrification.

Shirley Bloomfield, CEO of the [Rural Broadband Association](#), says rural America should have fast broadband, in part, because it's good for business.

She touted a 2016 [study](#) from the Hudson Institute that found that 66 percent of the economic impact of rural broadband went to urban economies rather than rural ones, given that many of the supplies needed to build these remote networks are sourced from urban areas. The same study estimated that if broadband was as good in rural areas as it is in urban ones, online retail sales would be "at least \$1 billion higher."

But there is also a less-quantifiable social good that fast internet access for all might bring to the country. Larry Downes, project director at the Georgetown Center for Business and Public Policy and an internet industry analyst, said that by virtue of excluding some, the internet's value as a network of connection was being diluted. "Any time we add one more person to the

internet, we get that many more possible connections of people, so that has greater value.”

More pointedly: “The more you create second-class citizens, the more we just continue to see some of these political divides,” Bloomfield said. The last election was proof of a breaking point. “I think rural America kind of sat back and roared a little bit.”

The town of Crestone, Colorado, sits off state Route 17, at the end of a long road that cuts through scrub-filled land at the base of the Sangre de Cristos. When I pulled in one early morning in late May, I didn’t see a soul, so I browsed the local bulletin board — a wood stove for sale, a missing young woman, yoga classes — and passed a lot filled with yurts and something that looked an awful lot like a satellite dish. Crestone has become home to a certain kind of person, eager to live out of the 2017 mainstream, and the town is filled with spiritual retreat centers and transplants from out of state.

It’s also where Colorado Central Telecom has an office. The small operation offers internet and phone plans to residents in Saguache County and neighboring Chaffee County and has tailored its service to the needs of the more isolated internet user. While most urban and suburban providers use fiber cables laid in the ground, rural providers often use something called fixed wireless internet to avoid the installation of miles of expensive cable. When the office opened, a technician named Joshua showed me a back room filled with the same kind of satellite-looking dishes I had seen on the yurt. If a home wants Colorado Central Telecom’s service, the dish is attached to it and pointed in the direction of the nearest fixed wireless tower so that a signal can be beamed to the home. The dishes must be in the line of sight of the tower, which can get tricky if trees or other obstructions are in the way.

Maisie Ramsay, head of business development for Colorado Central Telecom, set out to show me over the course of the morning the kind of path that airborne internet signals must travel around Saguache County. From Crestone’s center we drove to a massive tower in a field just outside the town, then to a school in Moffat, a few minutes to the west, where a dish sat discreetly on the back of the building as kids played out front. The tour ended in the town of Saguache, at the northern end of the county, with Ramsay and I

staring up at a tower on Cemetery Hill, a barren mound overlooking the tiny town. A woman named Pat Miller came out to ask if we were lost, and it turned out that she was a Central Telecom customer. “CenturyLink, you’ve probably heard, just was not going to give us the service,” Miller said, referring to the large telecom that services some parts of the San Luis Valley, where Saguache County is situated. “It was horrendous.”

This sort of complaint is common in Saguache County. In 2011, Ralph Abrams, the former mayor of Crestone, founded Colorado Central Telecom in direct response to poor service he said the town was getting from another large provider, Fairpoint. “Originally this started because Fairpoint was not providing more than half a [megabit],” Abrams told me. “Which is unusable,” Ramsay said. According to Abrams, the town was desperate for internet and the company was started because “none of the larger providers care about small rural areas.” Internet is a utility, Abrams said, and “utilities are a right for every person like road and sewer and water and electricity and we will bring it.”

Saguache County is a particular place. It’s still a bit cowboy-ish, though parts have an off-the-grid hippie feel. Its singularity of spirit means broadband can be a difficult sell to some. As one county commissioner, Tim Lovato, put it to me, “It’s kind of hard to carry a laptop when you’re on a horse.” It’s the sort of attitude that locals can brag about — a place that stands apart from the hustle and bustle of modern life — but one that others worry might hold back Saguache County in the future.

Lovato has lived in Saguache County his whole life. He grew up in a house with a wood stove and now lives in one with 32 big windows looking out on the mountains and a ranch that’s covered in chico, rabbitbrush and currant bushes. He drove me around one afternoon, pointing out his “girls” (cows), houses of people he’d known as a child, and prisoners from the county jail, out for their shackled afternoon constitutional in a residential neighborhood. Lovato, who uses internet only for emails and “maybe a little searching,” acknowledged that getting fast internet is important for keeping the county economically relevant, and yet over and over he expressed trepidation about what he called our “consumable world where everything is throwaway.” The internet seemed part of that to him, an immediate gratification machine.

At one point, I idly marveled that an old sawmill we passed, out of commission for decades, was still standing. “It’s not the internet, it’s not a renewable resource,” Lovato said in reply. The jump from sawmill to the internet took me by surprise, but it was as if Lovato was admonishing me for a mindset he perceived as out with the old, in with the new. Old sawmills, once gone, can never be replaced. A browser page will always refresh. The old things and ways of Saguache, he seemed to intimate, were in danger of being subsumed by a throwaway attitude if not for the vigilance of its residents. According to [Pew](#), of the 13 percent of Americans who say they don’t use the internet, about a third — 34 percent — said that’s because they didn’t see its relevancy to their lives.

Saguache County is a place unlike many in the United States, which is why, for its residents, its particular way of life is so important to preserve. Charged with maintaining a connection to Saguache’s Wild West past is Dorraine Gasseling, director of the county museum and perhaps the country’s most blasé, delightful docent. Gasseling took me on a whirlwind tour of the county’s treasures one afternoon. The San Luis Valley was once a part of Mexico — Lovato and many other multigenerational residents come from Spanish-speaking households — so in the museum there were Spanish lace mantillas and statues of the Virgin Mary, but also prehistoric arrowheads, dueling pistols, playing cards, dinosaur bones and a rock marked “uranium” that made me a little nervous.

The museum’s pièce de résistance was the original county jail, famous for having housed accused cannibal Alfred Packer. “We had a ghost hunter here,” Gasseling told me. “He said we have 17 ghosts.” She made sure to point out that although the graffiti etched by prisoners had lots of girly pic drawings, there were no “nasty words, there’s no ‘G-D,’ no ‘F’s.” Back then, she said, “they had some manners.”

Reverence for the past is not an uncommon feeling in Saguache. Various people over the course of my visit happily said that things were done differently in the county and in the valley as a whole. “We’re in a time warp but in a positive way,” Kevin Wilkins, executive director of the San Luis Valley Development Resources Group, told me. “This is one place that hasn’t been Californicated or Disney-fied.” Joan Mobley, the former town administrator of

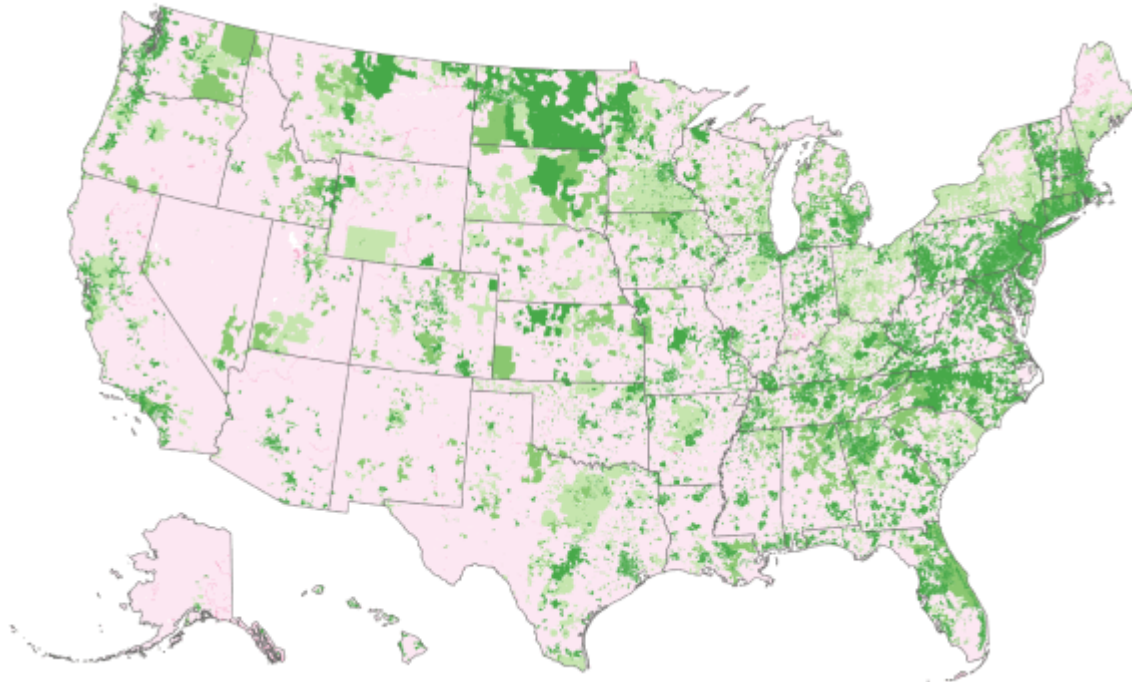
Center — population 2,000 — said that most people pay their utility bills in cash and in person every month. “They come in here and it’s not just time to pay bills, it’s to socialize.”

But Wilkins worries that Saguache’s lack of broadband could spell a future decline. Rural areas in America as a whole are already having a tough time. They’ve suffered population decline in recent decades, but there was a particularly steep drop-off starting in 2006, according to the U.S. Department of Agriculture, and rural areas are older than urban areas or suburbs. Rural America has lower labor force participation rates than the rest of the country because of its aging population. Marijuana grow operations have started to move into Saguache over the last few years, though that’s not the only kind of business that residents want to cultivate. Some people talk about the potential that broadband could bring, enabling small businesses, perhaps tech-based ones run by young people, to move to the valley to operate in a low-cost environment.

There are also more immediate needs to be filled. In health care for instance, Wilkins said, telemedicine consultations could provide residents with more and better health care options, which are crucial in sparsely populated rural America. Twenty-four percent of America’s veterans, a population with a growing need for mental health resources, live in rural areas. But, Wilkins said, “without robust connectivity, you can’t do telemedicine.”

“In order for rural areas to survive they need to overcome this lack of an economy of scale,” Wilkins said. And broadband is “the only way to bring [rural areas] parity to an urban environment.”

Broadband is still foreign to much of the U.S. Maximum advertised download speeds available to residential consumers from any non-mobile provider, by census block as of June 2016



Providers are required to give data on where they offer speeds above 0.2 megabits per second at the census block level. They do not guarantee that those speeds are available everywhere in a given block, or that where the maximum speed is available, consumers will experience the maximum speed. SOURCE: FEDERAL COMMUNICATIONS COMMISSION

Rural electrification was a relatively swift process, spurred by government funds and a national movement to modernize the country's infrastructure. But bringing sufficient internet to rural areas in the 21st century is slower and more piecemeal; small companies and cooperatives are going it more or less alone, without much help yet from the federal government.

There has been some indication that this could change. President Trump has [proposed](#) \$200 billion in infrastructure spending, and with his recent [statement](#) that the spending plan would "promote and foster, enhance broadband access for rural America," rural broadband advocates have some reason to be hopeful. But as of yet, there are no concrete plans for the initiative. Downes, who testified about broadband before the Senate Commerce, Science and Transportation Committee in May, said that there was "no discussion of when it's going to happen, what it's going to look like, where

the money is going to come from, whether it's going to be debt versus direct expenditures, whether it's going to be government spending versus loans.”

The way the government implements spending and to whom it gives funds matters to smaller telecom companies like the ones in and around Saguache County. Currently, the San Luis Valley's smaller internet providers that service its most remote areas are mostly frustrated by their interactions with the federal government.

“We applied, I want to say two years ago, for a grant that was broadband related and we did not get it,” Andrea Oaks Jaramillo, who works in economic development for the San Luis Valley Rural Electric Cooperative and Ciello, its related broadband venture, told me. “CenturyLink did get federal funding, actually, so everyone thought, ‘Oh yay, they’re going to do more things down here in the valley,’ and that has still yet to be seen.”

That frustration — that large companies are rewarded but don't do the work in the neediest areas — is a common theme in the valley. That has led local companies to think creatively about their own plans. Colorado Central Telecom's towers are beaming signals to local dishes, and Ciello is using loans from the San Luis Valley Rural Electric Cooperative and others to lay miles of fiber-optic cable in the hopes that the broadband venture's fast speeds can be a competitive advantage.

Competition among providers is welcome to people like Mobley, Center's former town administrator. “We're trying to invite anyone and everyone,” she told me, “to drive down costs and make [the internet] more available.” Center is home to a large community of agricultural workers, and money is tight in the town.

In an ideal world, though, the government would step in to help implement a broadband plan, opening up possibilities for Saguache County's towns and the San Luis Valley's small internet providers.

When I asked Mobley how she hoped the federal government would deploy help on broadband should the Trump infrastructure project be financed, she said that free public Wi-Fi would help residents. There was already a need for it percolating in the community. “We had people sitting in the park after 10

p.m. at night and we were trying to figure out what they were doing — they're not drinking," she said. It turns out a company next to the park had recently opened and its Wi-Fi wasn't password protected. The city told the company to password protect its connection, but it made Mobley think about whether that's something the town of Center might someday provide to its residents. "There are people here that are looking for that free service."

When I asked Abrams what he would look for in broadband funding from the federal government, he paused to consider: "Well, if the FCC would give funding to the small local people who know how to do it, I would say for a million bucks we could [provide broadband] in Saguache."

Asked the same question, Wilkins of the San Luis Valley Development Resources Group said he would want to connect "anchor institutions" — hospitals and schools — throughout the valley, and that, "realistically, pragmatically, if the federal government would put up \$10 million that we can leverage with creative financing and private sector investment and loans, that should help us accomplish the goal." Downes and his research partner Blair Levin, who helped [write](#) the National Broadband Plan of 2010, have [recommended](#) that \$20 billion be set aside nationally for a "one-time rural broadband acceleration program" that would, as Downes put it to me, "make it possible to provide broadband to all the current census tracts where it doesn't exist at all today."

Even if broadband funding and access arrive in Saguache County, there still will be cultural hurdles to overcome: the view that certain groups in the San Luis Valley don't need a connection. Wilkins wondered if all residents needed home broadband, or just some. "You're looking at Center School — look at the percentage of Latino, look at the percentage of farm worker. What do they need broadband for? To watch Netflix?" I pointed out that the kids in such households might need the internet to complete their schoolwork. Wilkins countered with cost. "If I'm making \$20,000, \$30,000 a year and I've got three kids, \$100 a month [for internet] might be whether [or not] I provide dental care for my children."

To Julio Paez, though, a Center native and the Center school district's information technology director, broadband access and students' exposure to technical knowledge is crucial to their future. Most students' summer jobs, Paez said, involve doing "back-breaking work" in the fields. "I'm speaking from a personal point of view: It motivates them more to say, 'I want to do something better, I want to continue my education and get a good career.'" In high school, Paez got a job helping the school IT director, then left Saguache for a few years to go to college. When he came back, Paez said, "I continued the tradition of hiring students." This summer, there are four helping him prep computers, iPads and other devices for the upcoming school year.

These unforeseen serendipitous opportunities — summer jobs that become careers — are what motivate the county's small internet providers to continue to pursue broadband as a public good. For now, no one in Saguache County is counting on a deus ex machina of funding from the federal government that turns universal broadband service from fantasy to reality. In real life, the practicalities wear.

"I'm tired," Abrams told me, "of being the David to everyone else's Goliath."

Additional contribution from [Daniel Lathrop](#) and [Dhrumil Mehta](#).
Development by [Justin McCraw](#).

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United States Senate

WASHINGTON, DC 20510

April 11, 2017

The Honorable Ajit Pai, Michael O’Rielly, and Mignon Clyburn
Federal Communications Commission
445 12th Street SW
Washington, DC 20554

Dear Chairman Pai, Commissioner O’Rielly, and Commissioner Clyburn:

We write to encourage the Federal Communications Commission (FCC) to continue working to advance broadband deployment in high-cost rural areas to give rural Americans the opportunity to obtain affordable broadband.

Congress has expressed broad support for modernizing the federal Universal Service Fund (USF) toward this goal. On May 6, 2014, 133 Members of Congress – 44 Senators and 89 House Members – signed bipartisan letters calling on the FCC to make tailored modifications to USF support for the delivery of broadband services to consumers in high-cost areas of the United States served by small, rural rate-of-return-regulated local exchange carriers. Similar letters were sent in May 2015 by more than 176 Members of Congress, including 61 Senators and 115 House Members.

The shared concern expressed in those letters was that rural consumers who wished to “cut the cord” on traditional voice “plain old telephone service” (POTS) and opt instead to obtain only fixed broadband services could not do so. As those letters noted, the FCC’s old rules unfortunately tied USF support to a consumer’s purchase of POTS, making it impossible for millions of rural consumers to obtain affordable “standalone broadband” without buying traditional telephone service as well.

We appreciate the steps taken by the FCC last year to address this concern. However, we are still hearing frustration about the prices for and the availability of standalone broadband. Many operators remain unable or unwilling to offer such broadband because their prices would still be unreasonably high even after the reforms. Other operators may offer standalone broadband, but the costs they are forced to recover from rural consumers far exceed what urban consumers would pay for the same service.

All this means that, despite the reforms last year, millions of rural consumers are still not seeing widespread affordable standalone broadband services due to insufficient USF support. Meanwhile, the limited USF budget also reduced the amount of funding available to carriers electing new “model-based” USF support, resulting in tens of thousands of rural consumers receiving slower broadband speeds than intended by the model or not gaining access to broadband at all.

We are concerned that the lack of sufficient resources in the reformed High-Cost mechanism may be undermining the desired effect of the reforms and falling short of the statutory mandate that reasonably comparable services at reasonably comparable rates be available to rural and urban Americans alike. We therefore encourage you to consider any changes to the High-Cost

mechanism that may be necessary to ensure it can achieve the goal of making affordable broadband available to Americans in high-cost rural areas.

Thank you for your consideration. We look forward to continuing to work with you to ensure rural American consumers and businesses have access to quality, affordable broadband.

Sincerely,



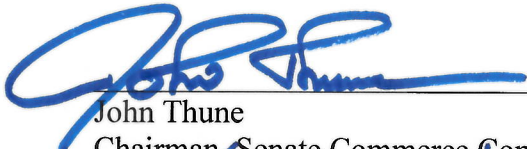
Deb Fischer
United States Senator



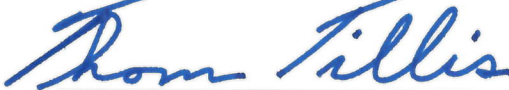
Amy Klobuchar
United States Senator



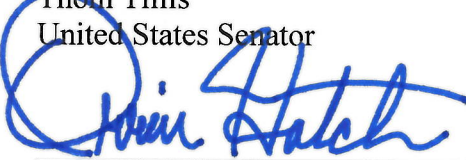
Roy Blunt
United States Senator



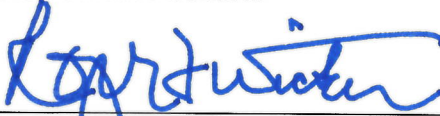
John Thune
Chairman, Senate Commerce Committee



Thom Tillis
United States Senator




Orrin Hatch
United States Senator



Roger F. Wicker
United States Senator



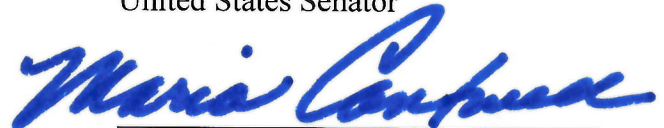
Richard Burr
United States Senator



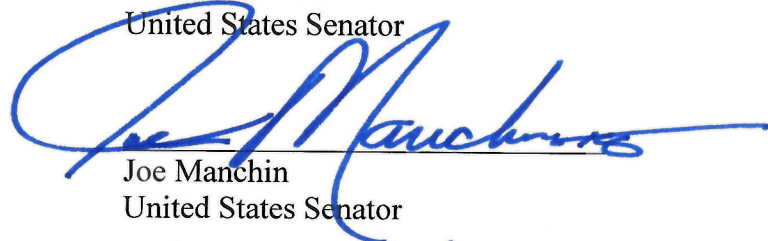
Claire McCaskill
United States Senator



Tammy Baldwin
United States Senator



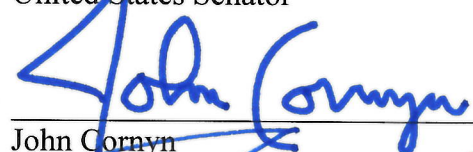
Maria Cantwell
United States Senator



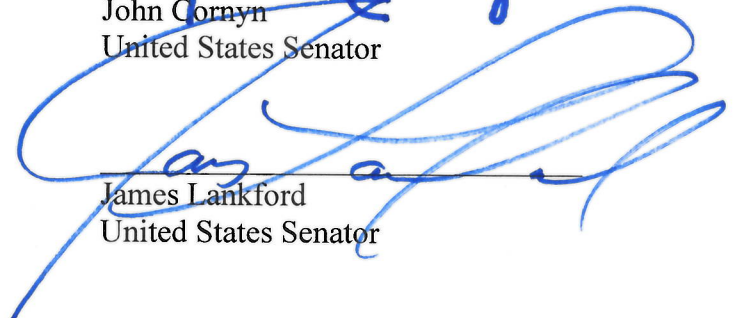
Joe Manchin
United States Senator



Kirsten Gillibrand
United States Senator

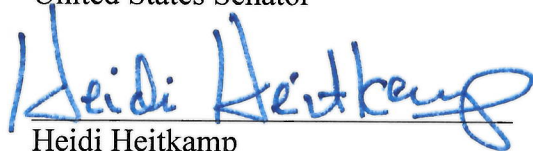


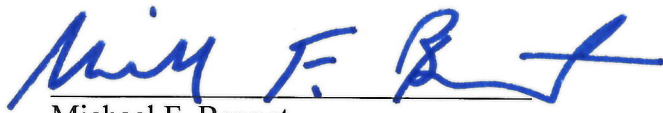
John Cornyn
United States Senator




James Lankford
United States Senator

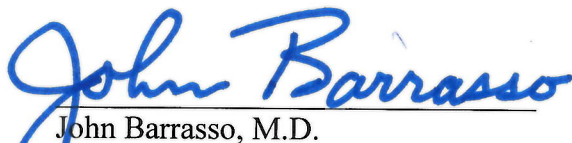

Shelley Moore Capito
United States Senator


Heidi Heitkamp
United States Senator


Michael F. Bennet
United States Senator

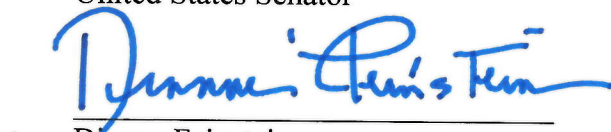

Ron Wyden
United States Senator

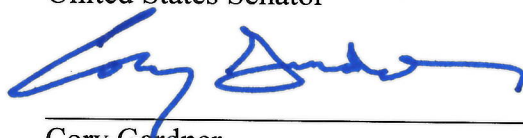

Pat Roberts
United States Senator



John Barrasso, M.D.
United States Senator



Tim Kaine
United States Senator


Tom Cotton
United States Senator

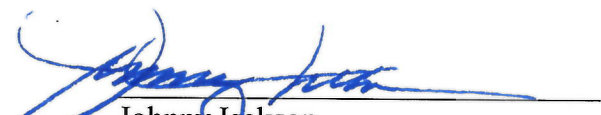

Dianne Feinstein
United States Senator


Cory Gardner
United States Senator



Al Franken
United States Senator



Joe Donnelly
United States Senator

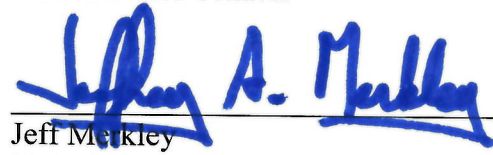

Lindsey O. Graham
United States Senator


Johnny Isakson
United States Senator

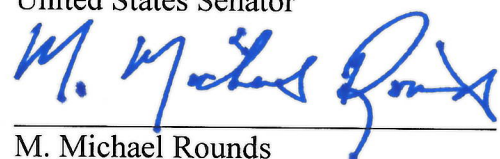

Jeanne Shaheen
United States Senator

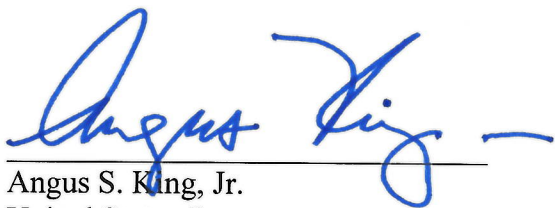

Todd Young
United States Senator


Richard Durbin
United States Senator


Jeff Merkley
United States Senator


Steve Daines
United States Senator

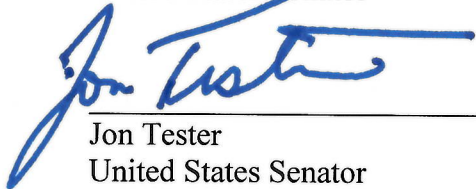

M. Michael Rounds
United States Senator



Angus S. King, Jr.
United States Senator



Rob Portman
United States Senator



Jon Tester
United States Senator



Chuck Grassley
United States Senator



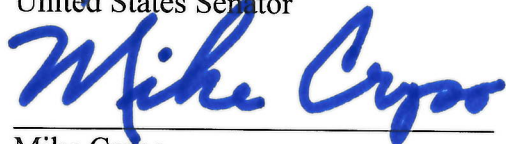
Bill Cassidy
United States Senator



Gary C. Peters
United States Senator



Tammy Duckworth
United States Senator



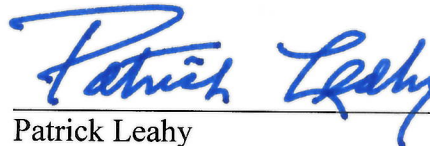
Mike Crapo
United States Senator



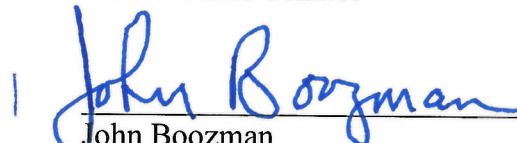
Debbie Stabenow
United States Senator



Margaret Wood Hassan
United States Senator



Patrick Leahy
United States Senator



John Boozman
United States Senator



Robert P. Casey, Jr.
United States Senator



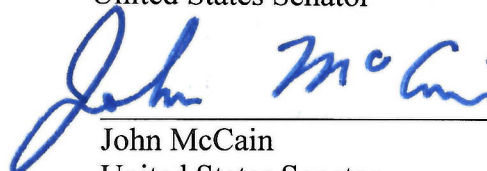
John Hoeven
United States Senator



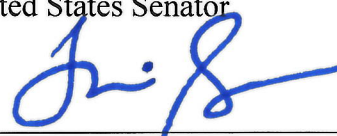
James M. Inhofe
United States Senator



Catherine Cortez Masto
United States Senator



John McCain
United States Senator



Tim Scott
United States Senator



Ben Sasse
United States Senator



Michael B. Enzi
United States Senator